

The World's Industrial and Cotton Centennial Exposition,
NEW ORLEANS, LA., 1884-85.

Medical Department, United States Army

EXHIBIT-CLASS 4.

No. 7.

DESCRIPTION

OF THE

COMPOSITE PHOTOGRAPHS OF CRANIA

AND OF

Crania from the Army Medical Museum,

WASHINGTON, D. C.

BY

SURGEON JOHN S. BILLINGS, U. S. A.,
Curator of the Museum.

HENRY McELDERRY,

Assistant Surgeon, U. S. A.

IN CHARGE OF THE REPRESENTATION OF THE MEDICAL DEPARTMENT U. S. A.

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**Description of the Composite Photographs of Crania,
and of Crania from the Army Medical Museum.**

By SURGEON JOHN S. BILLINGS, U. S. A.,
Curator of the Museum.

The composite photographs exhibited have been made at the Army Medical Museum, in Washington, to illustrate the application of this process to the study of craniology. The method of composite portraiture, as devised by Mr. Francis Galton, F. R. S., consisted in exposing each of a series of portraits, which had been reduced to the same size, successively before the same sensitive plate for a portion of the time required to make a good picture. The composites here presented are, however, made directly from the crania themselves, and not by combination of separate photographs.

The process may be briefly described as follows: Taking, for example, No. 1, it was found, with the light and exposure on that day, that it required about 490 seconds, with a wet plate, to obtain a good picture of a single skull. Seven adult male Esquimaux skulls were taken at random from the collection; that is, without any attempt to select skulls of same size or general appearance, the only points borne in mind in the selection being that they should be the skulls of adult males. These crania were exposed successively before the same plate for a period of 70 seconds each, that is, one-seventh of the time required for a perfect picture, and the result is a composite picture of the seven crania.

A part of the composites, as indicated in the list, were made by the use of wet plates, the average exposure being about seventy seconds for each of seven crania, or a little over eight minutes in all for the group. The greater part were taken on dry plates, the time of exposure for each cranium being about three seconds. These composites, being only first attempts, are not very satisfactory as photographs, the exposure in most of them having been too long; but they serve to indicate the amount of variation in shape and size which exists in adult crania of the same race and sex, and also to show that this method will afford a means of comparison of the crania of different groups with reference to the question as to how far distinctions of race are indicated by cranial variations.

How far this can be done may be seen, for example, by a comparison of the composites relating to the Sioux Indians and the Sandwich Islanders.

It is proposed to perfect the process, and prepare composite photographs of the principal groups of crania in the Museum, and it is hoped that this method may be made use of in other collections, as affording a valuable means of comparison between the crania possessed by them and those in the Army Medical Museum—a means of comparison which no system of measurements can take the place of.

The crania exhibited are a few typical specimens selected from the collection of the Army Medical Museum. This collection is already a large one, containing over 2,100 crania—the greater part of North American Indians—but it is very important that it should be made more complete, as regards many races or tribes, it being desirable to have at least twenty-five perfect crania in each group, while fifty would not be too many.

The following table shows the number and character of the crania in the collection, and indicates those groups in which additions are especially desirable:

		Total.	Imper-fect.
NORTH AMERICAN SKULLS.			
Esquimaux		89	6
Mound Builders from Dakota		24	8
" " Wisconsin		4	3
" " Iowa		6	5
" " Illinois		19	15
" " Indiana		6	1
" " Ohio		8	6
" " California		16	8
" " Utah		6	5
" " Missouri		2	2
" " Kentucky		30	15
" " Virginia		1	
" " Tennessee		42	38
" " Mississippi		50	32
" " Louisiana		8	6
" " Alabama		1	1
" " Florida		70	33
" " Arkansas		25	23
Indians from Alaska		55	12
" " Peel's River		2	
Newittee Indians		5	
Chemakum "		1	
Spokane "		1	
Flathead "		27	9
Clallam "		2	1
Salish "		2	
Chehalis "		3	
Makah "		4	
Nisqually "		7	
Nez Perces "		4	1
Watlala "		2	
Chinook "		23	1
Oregon "		14	7
Modock "		7	1
Shoshone "		2	
Snake "		6	1
Cascade "		1	
Ukah "		4	1
Ocki Pah Ute "		2	1
Pah Ute "		23	6
Utah "		3	1
California "		459	192
Nevada "		7	5
Aztec "		10	5

	Total.	Imperf.
NORTH AMERICAN SKULLS—Continued.		
Wintoon Indians	1	
Digger "	1	
Cow-cow "	5	
Navajo "	22	7
Apache "	38	8
Hare "	1	
Blackfeet "	6	5
Piegan "	14	1
Gros Ventre "	4	1
Mandan "	3	
Arickaree "	2	
Assiniboine "	5	1
Sioux "	36	6
Brule Sioux "	31	1
Ogallala "	15	
Yankton "	14	
Sisseton "	16	2
Santee "	1	
Teton "	1	
Wahpeton "	4	
Menominee "	1	1
Dakota "	15	
Ponka "	32	1
Crow "	2	
Caddo "	3	
Minnetaree "	25	10
Winnebago "	3	
Pawnee "	8	
Kickapoo "	2	
Arapahoe "	12	2
Cheyenne "	38	9
Kaw "	5	
Shawnee "	1	
Pottawatomie "	3	
Osage "	6	
Seneca "	1	
Wishita "	10	
Kiowa "	5	
Choctaw "	5	1
Chickasaw "	1	
Iowaulkeno "	1	
Kechi "	3	1
New Mexican "	7	
Comanche "	9	3
Lipan "	3	
Tonkaway "	6	
Texan "	4	2
Pueblo "	5	1
Mexican "	7	2
Cree "	1	

	Total.	Imper-fect.
NORTH AMERICAN SKULLS—Concluded.		
Chippewa Indians	20	4
Wisconsin "	8	5
Sac "	1	
Pequod "	3	1
Miami "	1	
Seminole "	5	1
Connecticut (Tunxis)	1	
Bannock "	1	
Cœur d'Alene "	1	
Unknown "	67	21
Negroes	47	3
Whites	128	29
CENTRAL AND SOUTH AMERICAN, INCLUDING YUCATAN.		
Yucatan Indians	8	1
Guatemala "	2	1
U. S. of Columbia Indians	1	1
Peruvian "	25	8
Matico "	4	
Chilian "	3	1
Patagonian "	3	
From Chatham Island	3	1
EUROPEAN SKULLS.		
Austrians	15	3
Bavarians	9	
Danes	1	
English	1	
French	2	
Germans	4	2
Hungarians	2	
Romans—British	2	
Laplanders	3	
Russians	11	
Spaniards	1	
Romans	1	
ASIATIC SKULLS.		
Esquimaux Asiatics	10	4
Chuckchees	2	
Japanese	5	
Coreans	2	
Chinese	6	
Botan Tribe of Formosa	3	
Jews	1	
AFRICAN SKULLS.		
Egyptians	1	
Hottentots	1	

	Total.	Imper-fect.
CRANIA FROM OCEANICA.		
Sandwich Islanders -----	147	36
South Sea Islanders -----	8	
Philippine Islanders -----	5	4
New Zealanders -----	17	1
Fiji Islanders -----	5	
Mixed Races -----	12	3
Unknown Crania -----	52	20

JOHN S. BILLINGS,
Surgeon U. S. Army,
Curator Army Medical Museum.

LIST OF COMPOSITE PHOTOGRAPHS OF CRANIA FROM ARMY MEDICAL MUSEUM.

Nos. 1, 2, 3, 4 and 5 were prepared by the ordinary wet process, with strong-working collodion, under an exposure of 70 seconds to each cranium.

Nos. 6 to 18, inclusive, were taken on Beebe's Gelatin Dry Plate. The exposure of each cranium in Nos. 6 to 13, and No. 16, was 3 seconds; in Nos. 14 and 15, only $1\frac{1}{2}$ seconds; in Nos. 17 and 18, one second.

No.	SUBJECT.
1.	Composite photograph of seven adult male <i>Esquimaux skulls</i> , side view, Nos. 1189, 1190, 1187, 1206, 1182, 1191, 1195, Section IV, A. M. M. Wet process, exposure 70 seconds.
2.	Composite photograph of seven adult male <i>Esquimaux skulls</i> , front view, Nos. 1189, 1190, 1187, 1206, 1182, 1191, 1195, Section IV, A. M. M. Wet process, exposure 70 seconds.
3.	Composite photograph of seven adult male <i>Sandwich Islanders' skulls</i> , side view, Nos. 425, 444, 442, 445, 446, 438, 286, Section IV, A. M. M. Wet process, exposure 70 seconds.
4.	Composite photograph of seven adult male <i>Sandwich Islanders' skulls</i> , front view, Nos. 425, 444, 442, 445, 446, 438, 286, Section IV, A. M. M. Wet process, exposure 70 seconds.
5.	Composite photograph of seven adult male <i>Sioux Indian skulls</i> , front view, Nos. 483, 793, 792, 1119, 665, 330, 816, Section IV, A. M. M. Wet process, exposure 70 seconds.

6. Composite photograph of seven adult male *Negro skulls*, side view, Nos. 980, 411, 955, 949, 953, 979, 954, Section IV, A. M. M. Dry process, exposure 3 seconds.
7. Composite photograph of seven adult male *Negro skulls*, front view, Nos. 980, 411, 955, 949, 953, 979, 954, Section IV, A. M. M. Dry process, exposure 3 seconds.
8. Composite photograph of seven adult male *Apache Indian skulls*, front view, Nos. 6578, Section I, 2108, 1709, 329, 209, 907, 1168, Section IV, A. M. M. Dry process, exposure 3 seconds.
9. Composite photograph of seven adult male *Apache Indian skulls*, side view, Nos. 6578, Section I, 2108, 1709, 329, 209, 907, 1168, Section IV, A. M. M. Dry process, exposure 3 seconds.
10. Composite photograph of eight adult male *Ponca Indian skulls*, side view, Nos. 836, 837, 835, 834, 831, 487, 486, 877, Section IV, A. M. M. Dry process, exposure 3 seconds.
11. Composite photograph of eight male adult *Ponca Indian skulls*, front view, Nos. 836, 837, 835, 834, 831, 487, 486, 877 Section IV, A. M. M. Dry process, exposure 3 seconds.
12. Composite photograph of seven adult male *White skulls*, Nos. 6306³, 7023, 6305, Section I, 63, 2118, 2119, 38, Section IV, A. M. M. Front view. Dry process, exposure 3 seconds.
13. Composite photograph of seven adult male *White skulls*, Nos. 6306³, 7023, 6305, Section I, 63, 2118, 2119, 38, Section IV, A. M. M. Side view. Dry process, exposure 3 seconds.
14. Composite photograph of eighteen adult male *Cheyenne Indian skulls*, Nos. 5560, 6525, Section I, 526, 2091,

- 528, 8, 715, 149, 146, 150, 1762, 9, 913, 464, 2121, 2090, 2035, 773, Section IV, A. M. M. Front view. Dry process, exposure 1½ seconds.
15. Composite photograph of eighteen adult male *Cheyenne Indian skulls*, Nos. 5560, 6525; Section I, 526, 2091, 528, 8, 715, 149, 146, 150, 1762, 9, 913, 464, 2121, 2090, 2035, 773, Section IV, A. M. M. Side view. Dry process, exposure 1½ seconds.
16. Composite photograph of seven adult male *Sandwich Islanders' skulls*, base view, Nos. 425, 442, 444, 445, 446, 438, 286, Section IV, A. M. M. Dry process, exposure 3 seconds.
17. Composite photograph of seven adult male *Sioux Indian skulls*, base view, Nos. 483, 793, 792, 1119, 665, 330, 816, Section IV, A. M. M. Dry process, exposure 1 second.
18. Composite photograph of seven adult male *Sioux Indian skulls*, side view, Nos. 483, 793, 792, 1119, 665, 330, 816, Section IV, A. M. M. Dry process, 1 second exposure. •

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LIST OF THE CRANIA FROM THE ARMY MEDICAL MUSEUM.

- Spec. 937. (Sect. IV.) Cranium of an Aleutian (prehistoric). from Ulakla Harbor, Amaknak Island, 1872. Collected by W. H. Dall. Received from the Smithsonian Institution.
- Spec. 688. (Sect. IV.) Cranium of a male Snake Indian, at. c. 50. From Fort Boise, Idaho, 1868. Donor: Surgeon C. Wagner, U. S. A.
- Spec. 691. (Sect. IV.) Cranium of a Chehalis Indian. From Gray's Harbor, Washington Territory, 1868. (?) Donor: Assistant Surgeon W. E. Whitehead, U. S. A.
- Spec. 246. (Sect. IV.) Cranium of a Makah Indian. From near Old Spanish Fort, Washington Territory, 1864. Collected by J. G. Swan. Received from the Smithsonian Institution.
- Spec. 810. (Sect. IV.) Cranium of a male Ukie Indian. From Round Valley, California, 1870. Donor: Assistant Surgeon E. J. Marsh, U. S. A.
- Spec. 117. (Sect. IV.) Cranium of a Flathead Indian. From Chinook Burial Place, at mouth of Columbia River, 1868. Collected by Mr. Lloyd Brooke. Received from the museum of the National Medical College.
- Spec. 1158. (Sect. IV.) Cranium of a female Flathead Indian,

- æt. c. 55. From Fort Cape Disappointment, Washington Territory, 1874. Donor: Assistant Surgeon John Brooke, U. S. A.
- Spec. 1117. (Sect. IV.) Cranium of a male Chippewa Indian.
æt. c. 35. From St. Joseph, 30 miles west of Pembina, Dakota, 1874. Donor: Assistant Surgeon Ezra Woodruff, U. S. A.
- Spec. 881. (Sect. IV.) Cranium of a female Ponca Indian.
æt. c. 30. From Old Ponca Agency, Niobrara River, Dakota, 1871. Donor: Acting Assistant Surgeon G. N. Hopkins, U. S. A.
- Spec. 683. (Sect. IV.) Cranium of a Comanche Indian.
From Fort Concho, Texas, 1869. Donor: Surgeon Wm. M. Notson, U. S. A.
- Spec. 523. (Sect. IV.) Cranium of a male Keechie Indian.
æt. c. 40. From bank of Arkansas River, 1869. Donors: Surgeon B. E. Fryer, U. S. A., and Acting Assistant Surgeon E. S. Umbstaetter, U. S. A.
- Spec. 2047. (Sect. IV.) Cranium of a female Sioux, æt. c. 55.
From Fort Robinson, Nebraska, 1880. Donor: Assistant Surgeon W. B. Brewster, U. S. A.
- Spec. 2073. (Sect. IV.) Cranium of an adolescent male Sioux.
From Fort Robinson, Nebraska, 1880. Donor: Assistant Surgeon W. B. Brewster, U. S. A.
- Spec. 176. (Sect. IV.) Cranium of a male Navajo Indian,
æt. c. 50. From Fort Sumner, New Mexico, 1868. Donor: Assistant Surgeon J. F. Weeds, U. S. A.
- Spec. 1560. (Sect. IV.) Calvarium of an unknown male Indian, æt. c. 60. From Winooski River, Vermont. Collected by Dr. E. M. Kent. Received from the Smithsonian Institution. Internal capacity, measured with No. 8 shot, 1920 c. c.

- Spec. 1236. (Sect. IV.) Cranium of a male Esquimaux, æt. c.
55. Collected in 1860-61 by Dr. I. I. Hayes.
- Spec. 259. (Sect. IV.) Calvarium of a male Kaiyuh Khotana,
æt. c. 35. From Nulato, Yukon River, Alaska,
1867. Collector: W. H. Dall. Received from
the Smithsonian Institution.
- Spec. 940. (Sect. IV.) Cranium of a male Moundbuilder,
æt. c. 60. From near Fort Totten, Dakota,
1871. Donor: Acting Assistant Surgeon J. B.
Ferguson, U. S. A.
- Spec. 168. (Sect. IV.) Cranium of a male Moundbuilder,
æt. c. 50. From near Fort Wadsworth, Dakota,
1868. Donor: Acting Assistant Surgeon A. I.
Comfort, U. S. A.

